independence of the two groups, which has led only to confusion; while the protection of all birds and eggs on Sundays and the licensing of bird-catchers and bird-dealers are new and valuable suggestions. It must be the hope of the British naturalist that as soon as possible these recommendations will be adopted and become the law of the land.

NOTES.

We are informed that the council of the Royal Society has nominated representative committees to deal with national questions connected with the international unions which it is intended to form under the International Research Council. The committee for astronomy will consist of the Astronomers Royal for England, Scotland, and Ireland, the Superintendent of the Nautical Almanac, six members nominated by the Royal Society, six members nominated by the Royal Astronomical Society, two members nominated by the Royal Society of Edinburgh, two members appointed by the Royal Irish Academy, and two members appointed by the British Astronomical Association. The committee for geodesy and geophysics will consist of the Astronomers Royal, the Director of the Meteorological Office, the Director-General of the Ordnance Survey, the Hydrographer of the Navy, two representatives of the Royal Society of Edinburgh, two representatives of the Royal Irish Academy, two members nominated by the British Association, and two members nominated by the Royal Society. Since their formation these committees have advised the council of the Royal Society on the formation of the international unions in their respective subjects, and nominated the delegates to the recent meeting at Brussels. The Federated Council for Pure and Applied Chemistry was also recognised as the national committee on that subject. As regards other subjects, similar committees will no doubt be established, but, no definite proposals having been submitted by any country, no action has hitherto been taken and the powers of the delegates attending the meeting at the invitation of the council of the Royal Society were limited to the obtaining of information with regard to the views of other countries concerning the establishment of international unions. The recommendations made only express the personal views of delegates attending the conference, and will, no doubt, be submitted to the proper authorities before any action is taken.

At the death of Prof. Milne in 1913 the British Association Seismological Committee decided to maintain the work at Shide, both the actual observations with seismographs and the collation of results from the Milne stations scattered over the globe. The seismographs were mounted in a disused stable; the clerical and computational work was carried on in an annexe built to the dwelling-house by the liberality of the late Mr. M. H. Gray. Mr. J. H. Burgess and Mr. S. W. Pring, two residents in the neighbourhood who had worked with Prof. Milne, were able to devote part of their time to the work under the general superintendence of the committee. The war steadily rendered this arrangement more and more difficult; Mr Burgess and Mr. Pring both ultimately left Shide, and early in the present year Mrs. Milne, from whom the observatory had been rented by the committee, announced her desire to sell the house, including the observatory, and to return to her home in Japan. In anticipation of the difficulties becoming acute, preparations had been made for transferring the work to Oxford. A seismograph was mounted last October in the basement of the Clarendon Laboratory, where Prof. C. V. Boys made his well-known gravity determination. Permission to make trial of this site was kindly granted by Mr. James Walker, then in charge, and has since been confirmed by Prof. F. A. Lindemann. The results have been eminently satisfactory, and there is ample room for the other component. The arrangements for housing the Milne seismological library (definitely left in his will to the British Association Committee) and the computational work are not yet finally settled, but no serious difficulty is anticipated in finding a solution. The arrangements are necessarily of a provisional type at this moment, and liable to be modified by future events, such as the possible establishment of a geophysical institute at Cambridge, and the action ultimately taken by the Seismological Section of the International Union of Geodesy and Geophysics recently established at Brussels. The Union itself was fully constituted, but the Seismological Section was suspended until some legal formalities connected with the extinction of the former International Seismological Association have been completed.

We regret to announce the death on September 2, at seventy-five years of age, of Prof. Alexander Macalister, F.R.S., professor of anatomy in the University of Cambridge.

Dr. C. A. Mercier, physician for mental diseases to Charing Cross Hospital, and a distinguished authority upon mental diseases and related subjects, died on September 2 at sixty-seven years of age.

The Lord President of the Council has appointed Prof. J. E. Petavel, F.R.S., to be director of the National Physical Laboratory in succession to Sir Richard Glazebrook, C.B., F.R.S., who retires on reaching the age-limit on September 18 next. Prof. Petavel is professor of engineering and director of the Whitworth Laboratory in the University of Manchester. He is a member of the Advisory Committee for Aeronautics of the Air Ministry.

The committee of the Wireless Society of London met on July 24, under the presidency of Mr. Alan A. Campbell-Swinton, with a view to an early resumption of activities. The hon. secretary, Mr. R. H. Klein, having resigned, and been elected an acting vice-president, Mr. Leslie McMichael, of 30 West End Lane, West Hampstead, N.W.6, has been elected hon. secretary, and to him all communications should be addressed. The society is open to all those interested in the study and furtherance of wireless telegraphy, amateur or professional.

The Edward Longstreth medal of the Franklin Institute, Philadelphia, has been awarded to Mr. J. J. Skinner, of the Bureau of Plant Industry of the U.S. Department of Agriculture, for his papers on "Soil Aldehydes," concerning which the committee reported: "These papers present the results of scientific study of a new class of deleterious soil constituents, clearly described and effectively illustrated, the whole forming a valuable contribution to the science of agricultural chemistry, and one of marked practical importance."

From the Proceedings of the Institute of Chemistry we note that the preparation of an account of the services of British chemists during the war is under consideration. A synopsis of the possible contents of a book on the subject has been drawn up, and preliminary arrangements have been entered into with publishers. Such a work may be made both interesting and valuable, and it is to be hoped that the project will be worthily carried out. All chemists who are in a position to assist in the matter are invited to communicate with the registrar of the institute.

Two important geological collections of more than local interest have recently been acquired by the Hull Municipal Museum, viz. the Drake and Bower collections. The first was formed by the late H. C. Drake, F.G.S., who spent many years in the Scarborough district, and also collected largely among the saurian and other vertebrate remains of the Oxford Clay in the Peterborough area. The other collection was formed by the Rev. C. R. Bower. Many of the specimens are described and some figured in his paper on "The Zones of the Lower Chalk of Lincolnshire" in the Proceedings of the Geological Association for 1918. This collection consists of more than a thousand excellently cleaned Chalk fossils, carefully labelled and localised, including many of those which have been figured in his paper, as well as one of the two known examples of *Actinocamax boweri*, the other specimen being in the British Museum. The collections are largely from the Lower Chalk of Lincolnshire and the Chalk of Yorkshire, and there is an interesting series from the Upper Cretaceous of Dover, Folkestone, Kent, and Norfolk.

THERE is no denying the value of intelligent propaganda for increasing business and cultural relations between various nations. As an example of the right kind of propaganda we would mention the Bulletin of the Pan-American Union, published in English, Spanish, Portuguese, and French. This magazine contains authoritative articles on North and South American activities, most of them being splendidly illustrated.

THE *Bulletin officiel de la Foire de Lyon*, of which two recent issues are to hand, is the outcome of the first Lyons Fair, and its object is to keep manufacturers and others in touch with the development of these fairs in France and other countries. In this connection it is interesting to note that the next Lyons Fair will be held on October 1–15 next. The previous fair was a great success, but it is hoped that British manufacturers will be more adequately represented at the forthcoming fair. American competition in France, especially in matters engineering, is very keen, and it is up to British enterprise to see that no trouble is spared in order that French traders, engineers, consumers of scientific products, etc., may know exactly what Britain is able to offer them.

IN the current issue of the *Quarterly Review* Sir Lynden Macassey discusses very ably "The Economic Future of Women in Industry." The author is specially well qualified for his task, as he was a member of the War Cabinet Committee which made extensive inquiries into the subject, and during the war he acted as arbitrator in innumerable labour disputes. He rightly states that the public in general but little appreciates the enormous latent and unutilised capacities for production possessed by the women of the nation. He points out that between 1914 and 1918 more than 700,000 women directly replaced men in industry, and did work customarily done by men. On repetition work, which was such a pronounced feature of war-time employment, women often proved superior to men, as they do not suffer from the monotony to which men are so susceptible. On the other hand, they are not man's equal in skilled work, and because of their greatly inferior physical strength they cannot replace him in the heavier types of industry. As regards the future, there ought to be no trade union rules which debar women from any employment which is commensurate with their industrial qualifications, but women must not be allowed to undercut and displace men. They must come in as additional workers to accelerate the increased productivity which is such a crying need of the present day. Sir Lynden Macassey approves the conclusion of the Committee that women on piece-rates must, as compared with men, receive "equal pay for equal work," but both he and they have missed the fallacy involved in such a contention. If the average woman has as large an output as the average man she is entitled to equal pay, but not otherwise. In most industries the cost of establishment and machinery is far higher than the cost of wages, and if, for instance, the woman produces only four-fifths as much as the man, it would not be reasonable for her employer to pay her four-fifths his wages. Probably he could not afford to give her even three-fifths as much.

AMONG the pamphlets on reconstruction problems recently published by H.M. Stationery Office is one relating to Industrial Research (No. 36, price 2*d*.), which ought to be read by the public, whether directly concerned with industry or not. It contains in fewer than thirty pages a very instructive sketch of the position in the past, and of what has already been accomplished in the way of instituting and organising new fields of research and indicating what may be hoped for in the future. At the present time there can be few people who are not convinced of the necessity for research in its relation to industry, but it was not always so. Looking back only forty years or thereabouts, it may be asserted that at that time practically no provision was made by manufacturers for improvements in their several industries. Among the earliest of the manufacturers of iron and steel to carry on research were Sir Isaac Lowthian Bell and Sir Bernard Samuelson, but in other directions there was practically nothing to be seen in the way of research except—to their credit be it said—among the great brewers, who set a fine example to the rest of the world in the way they proceeded to apply the results of Pasteur's discoveries. In connection with agriculture the work of Sir John Lawes at Rothamsted, aided through many years by Sir Henry Gilbert, represented an advance of incalculable importance. Besides showing what can be done, their work seems to illustrate the fact that research, and hence discovery, have in the past depended chiefly on the enthusiasm of the individual man of science. It remains to be seen how far this will continue to be the case. This certainly seems probable in connection with pure science, but we have yet to learn the extent to which organisation will facilitate the discovery of new facts and principles, though there can be no doubt as to the more abundant results which must accrue from the application of such facts and principles to practical purposes. It is now clear that as there must be more scientific work done, there must be a larger number of properly trained scientific workers; and one of the first duties of the State will be to see that the universities and places of higher instruction are provided with the means of giving the instruction needed, and that conditions are so improved as to give the encouragement wanted to induce the most capable among the rising generation to pursue science as a career. It is rightly pointed out in the pamphlet that working-class opinion especially should be made aware of the vital importance of research.

THE *Mexican Review* of July describes, with photographs, a remarkable series of stone and terra-cotta remains discovered in the neighbourhood of the city of Mexico by Prof. W. Niven. The writer supposes that these remains, rude in design and workmanship in comparison with those from the upper strata, represent Chinese, Egyptian, and negro faces, buried under deposits of lava from volcanoes in prehistoric times. Besides these were found beads of jade, "presumably from China," and seals, "in imitation, or perhaps precedence, of like objects found in the Babylonian and other ruins of the Far East." It is to be hoped that these articles will soon be examined by experts. If these statements can be verified, they will furnish valuable evidence in support of the conclusions of Prof. Elliot Smith and other advocates of the theory of culture transmission.

We have received No. 14 of the Journal of the East Africa and Uganda Natural History Society, written by residents in the African tropics, but printed in this country and published by Messrs. Longmans and Co. The issue contains descriptive articles on such subjects as the transmission of human and animal diseases by blood-sucking insects, and a number of short original notes on the habits of various African animals, such as baboons, crocodiles, and the aardvark.

The report on Scottish ornithology for 1918 by the Misses Rintoul and Baxter, which appears in the July–August issue of the *Scottish Naturalist*, is an excellent and comprehensive compilation, and affords much information on a variety of subjects associated with bird-life. Though the necessary field-work during the year was carried out under greater disadvantages than ever before, yet the contributions of the numerous recorders relate to observations on no fewer than 184 species. No new birds were added to the avifauna, and the list of uncommon alien visitors is a short one, but a number of species are mentioned as appearing in counties in which they were previously unknown. The influence of weather on bird-life during the year, the results of "ringing," and notes on plumage, food, habits, etc., are also given. The final section of the report deals with the migratory movements of both native species and birds of passage. The observations, which are concisely treated, have been made throughout the mainland and at coastal and insular stations from the Muckle Flugga—the northernmost outpost of the British Isles—to the Tweed and the Solway. The data relate to the comings and goings of no fewer than 160 species.

The *Times* of August 18 contained an interesting article on the little owl as a danger to poultry and game. This bird was not originally a native of the British Isles, but was introduced into several parts of England in some numbers about a quarter of a century ago by several well-known ornithologists, who cannot have been aware of its harmful proclivities. Apart, however, from its vices, it is an attractive little bird. Since its introduction it has increased very rapidly, and is now widely distributed over England, and some have found their way into Wales, Scotland, and Ireland. Wherever it has established itself it has become a pest to poultry-keepers and game-preservers owing to the havoc it makes among the chicks. It also destroys great numbers of small birds up to the size of a blackbird. Although the little owl's record is, in the main, a black one, and far outweighs anything that can be placed to its credit, yet it must be admitted that it destroys large numbers of small rodents, such as field-voles, as well as beetles and other insects, and thus renders some service to the agriculturist. The article is evidently based upon a wide knowledge of the bird, and affords much information on other aspects of its life-history.

In the Bulletin of the Imperial Institute (vol. xvii., 1919, pp. 40–95) there is an excellent detailed account of the production and consumption of cocoa, chiefly in the different countries of the Empire, and showing very clearly the disparities between them in various parts of the world. The United States, using 66,500 tons in 1913, is the greatest consumer, whilst its production is negligible. The United Kingdom in 1913 consumed about 28,000 tons, a great deal of which was imported from foreign countries, while the Empire produced about 88,000 tons, the bulk of which had to go abroad for consumption. In 1917, owing chiefly to the enormous increase of cultivation on the Gold Coast and elsewhere in West Africa, the production increased to 142,800 tons. No attempt is made to describe the methods of preparation in use in the different Colonies, and one is left to infer, when noting the comparative values of cocoa given in various places, that in general they leave a good deal to be desired. The cocoa situation at present evidently turns upon the crop of West Africa, and if that country continues to turn out such enormous quantities of an inferior article, trouble is certain to ensue. The great desideratum at the moment is to increase the consumption of this most valuable food and palatable drink, and it is difficult to do so if the quality be but poor. Cocoa, it is well known, can be produced with less trouble than many other tropical crops, especially if some of the poorer Forastero varieties be employed, but to prepare it of really good quality—as, for instance, it is prepared by the English planters of Ceylon—involves much trouble and the use of better varieties. Nothing less than this, however, will save the market from being glutted with inferior brands of cocoa.

Under the title "Gossypium in Pre-Linnæan Literature" (Botanical Memoirs No. 2, Oxford University Press), H. J. Denham traces the literature of cotton-yielding plants from the earliest writers to the time of Linnæus. The earliest reference to the use of cotton for textiles is by Herodotus, who mentions trees in India "the fruit whereof is a wool" of which the natives make clothes. The first reference in botanical literature is by Theophrastus (370–285 B.C.), who speaks of a wool-bearing tree on the Island of Tylos (in the Persian Gulf). Pliny (A.D. 23–79) repeats the information, but quotes the name "Gossypinum" for the trees. Between the classical writers and the herbalists who followed the Renaissance no botanical mention of cotton occurs. By this time the plant was well known around the Mediterranean. The first figure of Gossypium in European literature would seem to be in the "Herbal" of Dorstenius (1540) under the name of Bombax—apparently a conventional drawing of the Asiatic species, *Gossypium herbaceum*. A better figure of this plant was given by Fuchs ("Historia Stirpium," 1542), with a detailed account; but that of Matthioli ("Kreutterbuch," 1563) is more satisfactory. Cæsalpino (1583) was the first botanist to indicate the relationship of the plant to the mallows. In 1592 Prosper Alpinus, in his account of the flora of Egypt, describes and figures another species, *G. arboreum*, a small perennial shrub, a native of northern Africa. Columbus and the early explorers had found cotton in cultivation in the New World, and in 1651 Hernandez figured a Mexican species, *G. mexicanum*, the possible parent of the upland cottons. The botanical history of cotton in the later pre-Linnæan writers is mainly a record of the attempt to simplify the confusion created by the description of different species under the same headings, as, for instance, by Plukenet ("Phytographia," 1691), though fortunately in this case the specimens from which the plates were drawn are preserved in the Sloane Herbarium in the British Museum. Linnæus (1753) defined four species, the two Old World forms and two American, one of the latter being *G. barbadense,* presumably the parent of the "Sea Island" cotton.

METEOROLOGICAL Office Circulars Nos. 37 and 38, issued July 1 and August 1 respectively, deal with current official notices. Reference is made in the July circular to Professional Notes No. 7—"The Climate of North-West Russia," which was prepared for the use of the British forces acting on the Murman coast. The general climate is discussed for the district extending from the Arctic Ocean on the north to Petrograd and the Gulf of Finland on the south, and from the Swedish frontier on the west to 45° east on the east. It deals with the dates of the thawing and freezing of the rivers. The temperature of the upper air is discussed, and other meteorological information is given. Upper-air temperatures in the north-east of France are given for the end of April last as being of interest in connection with the heavy snowfall over England on April 27. The upper air was abnormally cold. The August circular has an obituary notice of Lord Rayleigh.

THE very effective hardening solution for gelatine negatives that Messrs. Ilford, Ltd., recently introduced is applied as a preliminary bath, before development, and enables development, etc., to be carried on at as high a temperature as 110° F. without any cooling being necessary. In the specification of the patent granted to Messrs. Agnew and Renwick, both of Messrs. Ilford, Ltd. (see *British Journal of Photography,* August 8), it is stated that the formaldehyde, which is the real hardening agent, is mixed with a salt of the class which tends to restrict the swelling of dry gelatine in water and raise its melting-point, so that even though the bath may be at as high a temperature as 110° F., the gelatine has no opportunity of melting before it is hardened by the formaline. This class of salts includes acetates, tartrates, citrates, oxalates, sulphates, phosphates, chromates, bicarbonates, and borates. Example formulæ are given, using sodium sulphate and ordinary sodium phosphate.

A PAMPHLET issued by the Optical Pyrometer Syndicate, of Audrey House, Ely Place, E.C.1, contains some notes on optical pyrometers in general, and a special account of the "wedge" pyrometer and its uses. The early form of this instrument was described in NATURE for July 22, 1915, the principle relied upon being the complete extinction of the source of light by means of a wedge of dark glass interposed between the eye and the source, the temperature being deduced from the thickness of dark glass needed to secure extinction. It is claimed that not only can concordant results be obtained by a single observer trained to the use of the instrument, but also that separate observers may obtain readings agreeing to within 20° C. at 1500° C. One of the disadvantages of all optical pyrometers is that the personal judgment of the operator must be relied upon, either in matching tints or in producing total extinction, and for these purposes all eyes are not equally sensitive. In view of the great increase in the use of optical pyrometers, an impartial investigation of the various types from this point of view would be an advantage, due regard being paid to the type of observer employed in workshops. If the agreement in readings claimed for the "wedge" pyrometer should prove to be general for all types of observer, this instrument ought to be very useful, and its simple construction a recommendation for industrial purposes.

ACCORDING to an editorial note in the *Scientific American* for July 19, the romance of invention is to be illustrated in a series of articles on Americans who have produced inventions of the first rank which have proved financially successful. The whole record shows that the ability to invent and the ability to make a commercial success of an invention are seldom combined in one man, and the editor almost regards them as mutually exclusive. The first article of the series deals with the telephone. Dr. Graham Bell, who is now seventy-two, invented the telephone in 1876. He himself says he is not a business man and that his interest in the commercial side of an invention is small. He was, however, in the early days of the telephone so fortunate as to be associated with able business men who not only made it a commercial success, but also safeguarded the inventor's interests in such a way that its success was of benefit to him. It is not desirable that so large a proportion of those who invent or discover something of the greatest value to humanity should see the reward pass to others while they themselves get little or no recognition from their country or the world at large.

THE Journal of the British Science Guild for July contains a summary of the proceedings of various committees, including those dealing with education and with the metric system, and an account of the thirteenth annual meeting held on June 17. The education committee emphasises the unfavourable position of this country, as regards both the financial position of institutions for higher education and the number of students of university grade, in comparison with other countries. A detailed report on "Industrial Research and the Supply of Trained Scientific Workers" has been sent to the Prime Minister, to the President of the Board of Education, and to universities and similar educational bodies. Special attention has also been devoted by the guild to the organisation of research in relation to fisheries, and importance is attached to the establishment of an institute and museum of oceanography, similar to those in existence in Berlin and in contemplation in Denmark. The attention of the Government has also been directed to the importance of establishing a strong optical industry in this country. A measure recommended is the introduction of certificates of origin of optical goods as a safeguard against fraudulent competition. The report of the thirteenth annual meeting includes the addresses delivered on that occasion by Major-Gen. Seely, Lord Sydenham, and Sir J. J. Thomson. The journal also contains an appreciation of the late Sir Boverton Redwood by Prof. F. Clowes.

Mr. Edward Arnold announces a new series entitled The Modern Educator's Library. The general editor is Prof. A. A. Cock, and the aim is to present the considered views of teachers of wide experience and ability upon the changes in method involved in the development in educational theory and practice, and upon the problems as yet unsolved. The first volume of the series (by Prof. T. Percy Nunn) will form an introduction to it, and will deal with the fundamental questions which lie at the root of educational inquiry. It will be entitled "Education: Its Data and First Principles." Succeeding volumes will be "Moral and Religious Education," Dr. Sophie Bryant; "The Teaching of Modern Foreign Languages in School and University," Prof. H. G. Atkins and H. L. Hutton; and "The Child under Eight," E. R. Murray and H. Brown Smith. Other books announced by the same publisher are:—"A Physician in France," Sir Wilmot Herringham; "The Struggle in the Air, 1914–18," Major C. C. Turner; "Memories of the Months," Sir Herbert Maxwell, Bart., sixth series; "Gardens: Their Form and Design," Viscountess Wolseley; and "Modern Roads," H. P. Boulnois. *Messrs. Thomas Murby and Co.* announce:—"An Introduction to Palæontology," Dr. A. Morley Davies; "Petrographic Methods and Calculations," Dr. A. Holmes; and "A Nomenclature of Petrology," Dr. A. Holmes. *Messrs. Scott, Greenwood, and Son* have ready for publication the second English edition of "Chemical Reagents: Their Uses, Methods of Testing for Purity, and Commercial Varieties," Dr. C. Krauch; a new edition, by A. B. Searle, of the translation of E. Bourry's "A Treatise on Ceramic Industries"; and a new edition of "Modern Brickmaking," A. B. Searle.

ALL communications for the Imperial Mineral Resources Bureau should in future be sent to 2 Queen Anne's Gate Buildings, Westminster, S.W.1, to which address the Bureau has recently removed.

OUR ASTRONOMICAL COLUMN.

METCALF'S COMET.—The following orbit of the comet discovered by Mr. Metcalf on August 21 is by Miss Vinter Hansen and Mr. Fischer-Petersen from observations on August 21, 22, 25:—

$$T = 1919 \text{ Oct. } 16{\cdot}1984 \text{ G.M.T.}$$

$$\left.\begin{aligned} \omega &= 128^\circ\ 33\ 32' \\ \Omega &= 311^\circ\ 22\ 93' \\ i &= 19^\circ\ 58{\cdot}03' \end{aligned}\right\} 1919{\cdot}0$$

$$\log q = 9{\cdot}68280$$

Error of middle place (observed *minus* computed), $+0{\cdot}39' + 0{\cdot}09'$.

Ephemeris for Greenwich Midnight.

		R.A. h. m. s.	N. Decl. ° ′	Log r	Log Δ
Sept. 5	...	19 13 33	74 56·2	0·0147	9·3095
7	...	16 25 41	76 26·4	9·9997	9·3174
9	...	14 19 50	71 48·1	9·9842	9·3375
11	...	13 19 10	65 9·2	9·9681	9·3666
13	...	12 47 47	58 37·0	9·9515	9·4016

The magnitude remains nearly constant at $6\frac{1}{2}$, so that it is on the verge of naked-eye visibility.

Prof. Leuschner telegraphs that he identifies the comet with comet 1847 V (Brorsen), which was expected about this time. If this is confirmed, it will be the fourth member of the Neptune group to be observed at a second return, the others being Olbers's, Pons-Brooks's, and Westphal's. Halley's comet is not reckoned.

THE RECENT SHOWER OF PERSEIDS.—The return of these meteors was fairly well observed this year, though the full moon occurring on August 11 greatly moderated the visible aspect of the display. The weather was very favourable, and a considerable number of meteors were recorded by Mrs. F. Wilson at Totteridge, Mr. S. B. Maltey at Ilfracombe, Mr. A. King at Scunthorpe, in Lincolnshire, and Mr. Denning at Bristol. The radiant point appeared rather more diffuse or scattered than usual, but it exhibited the usual E.N.E. movement amongst the stars when observed on successive nights. A companion shower between α and β Persei was strikingly evident this year, and it furnished some fine meteors radiating from the point $48^\circ+44^\circ$. Other contemporary showers were remarked from $336^\circ-10^\circ$, $310^\circ+80^\circ$, $313^\circ+48^\circ$, $303^\circ-9^\circ$, and $303^\circ+24^\circ$; and between August 22–29 many small, slowish meteors were traced from positions at $332^\circ+57^\circ$ and $348^\circ+61^\circ$. The most brilliant Perseid seen flashed out on August 12 at 10h. 32m. G.M.T., and it was recorded at Totteridge, Bristol, and several other places. Its height was from 76 to 51 miles, and it passed from a point above 10 miles W.N.W. from Worcester to 10 miles E. of Tredegar in South Wales.

INTERNATIONAL STANDARDISATION.[1]

M. GUILLAUME, the distinguished director of the Bureau International, is to be congratulated on the issue of this important volume.

And yet it is a sad record; the greater part is occupied with the *procès-verbaux* of the fifth International Conference of Weights and Measures held at Paris in 1913, and attended by representatives of all the principal countries of the world, many of whom will never meet again. Much of the rest is the last work of Pierre Chappuis, whose death is recorded in a note to one of the papers by M. Guillaume, and to whose labours are due the determinations of so many important constants.

The *procès-verbaux* of the conference demand our first attention, for the meeting was, in many respects, important, and new ground was broken in various directions. The decisions reached by the delegates remain unfulfilled, and it will no doubt be the business of the sixth conference—which it is generally understood is to meet shortly—to consider the steps that should now be taken to give effect to them or to modify them as may seem best; for on some of the matters discussed considerable difference of opinion may well arise.

The fundamental business of the conference concerns weights and measures, the determination of standards of mass and length, the kilogram and the metre. The accurate calibration of these at once involves the measurement of temperature, and accordingly much of the work of the Bureau has dealt with scales of temperature; the scale of the constant-volume hydrogen thermometer was chosen as standard, and all temperatures referred to it. For the range 0° to 100°, or, indeed, for one rather outside these limits, this sufficed, but accurate determinations of temperature are now required down to the temperature of liquid air and up to perhaps 2500° C. The hydrogen thermometer is useless for such a range, and some steps were necessary to secure international agreement throughout the scale. There was no doubt that the absolute thermodynamic scale was the standard to aim at; on the other hand, there was no certainty as to the methods to be taken to realise that scale over the greater portion of the range. And so the conference, after emphasising the importance of researches which had for their object the perfecting of our knowledge of thermometric scales, expressed itself as (1) ready to substitute for the international service of weights and measures the Absolute scale in place of the "normal"—*i.e.* hydrogen—scale so soon as the relationship between these scales had, thanks to the researches contemplated, been determined with sufficient certainty, and (2) approving the determination of a certain number of standard temperatures as fixed points of the scale, to be suitably chosen and agreed upon as soon as possible.

With the view of giving effect to this last resolution, the conference invited the International Committee on Weights and Measures to arrange with the directors of the national laboratories which had been dealing with the measurement of temperature to meet at the Bureau to select the standard temperatures and to take steps to secure their general adoption. In

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[1] "Travaux et Mémoires du Bureau International des Poids et Mesures." Tome xvi. (Paris: Gauthier-Villars et Cie, 1917.)